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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,777	06/06/2006	Hiromitsu Tsuji	9084-000003/US/NP	7141

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EXAMINER

THOMPSON RUMMEL, PONDER N

ART UNIT	PAPER NUMBER
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1753

MAIL DATE	DELIVERY MODE
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06/27/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/581,777

Applicant(s)

TSUJI ET AL.

Examiner

Ponder N. Thompson-Rummel

Art Unit

1709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on June 6, 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/6/2006.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

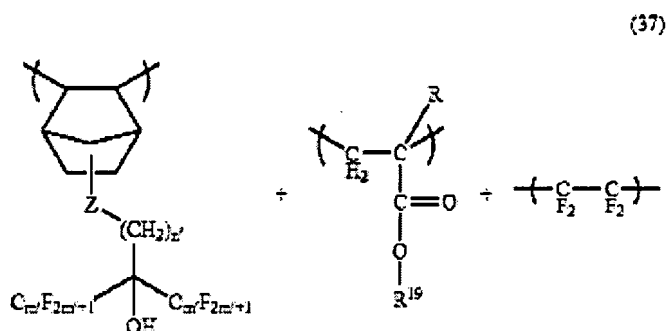
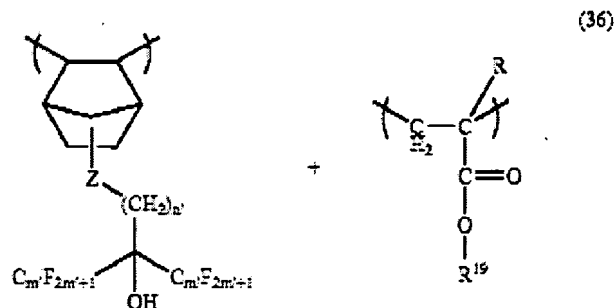
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirayama et al. (WO 2004079800 wherein citations are from US 2006/0154188 equivalent document) in view of Hada et al. (WO 2004108780 wherein citations are from US 2007/0065748 equivalent document).

With regards to claim 1-3, Hirayama et al. discloses a resin composition for use in an immersion lithography fluid that comprises:

- A. a polymer of formulas (36) and (37) (paragraph [0142]) that comprises a fluorine atom or fluorinated alkyl group and an alcoholic hydroxyl group, such as an alcoholic hydroxyl group-containing fluoroalkoxy groups and alcoholic hydroxyl group-containing fluoroalkoxyalkyl groups (paragraphs [0135]-[0136]),

Art Unit: 1709

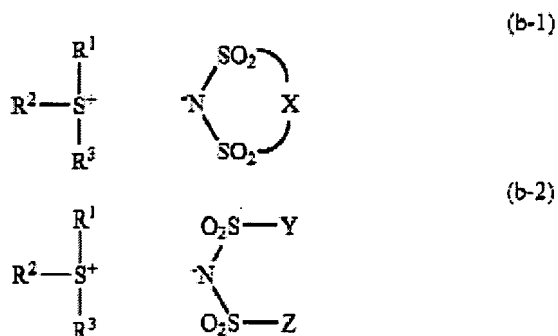


- that are bonded to an a cyclic group that forms the backbone (paragraph [0144]) wherein Z is an oxygen atom, oxymethylene group or single bond and n' and m' are integers from 1 to 5 (paragraph [0138] and [0142]);
- B. an acid-generating component which may be any know compound used in chemical amplication type resist (paragraph [0206]);
- C. a nitrogen-containing compound such as an alkanol amine compound (paragraph [0213]) for example, triethanolamine and diethanolamine (paragraph [0167]) and trimethylamine (a tertiary amine – paragraph [0167]); and
- D. an organic carboxylic acid such as malic acid, succinic acid, and benzoic acid (paragraph [0169]) or an oxo acid of phosphorus such as phosphoric acid, di-n-butylphosphate and diphenylphosphate (paragraph [0170]).

Art Unit: 1709

Although Hirayama et al discloses the use of an acid-generating compound, Hirayama et al. failed to disclose the use of an acid-generating compound comprising an iminosulfonate structure as claimed by applicant in claim 1.

Hada et al. discloses photoresist compositions comprising an iminosulfonate acid generator component that is represented by formulas (b-1) and (b-2) (or sulfonium compounds 1 and sulfonium compounds 2, respectively – paragraph [0121]) that meets the limitations of the acid-generating agent set forth by applicant in claim 1.



In formulas (b-1) and (b-2), X represents a straight chain or branched alkylene grouping which at least one hydrogen atom has been substituted with a fluorine atom (paragraph [0122]), R^1 to R^3 each represent, independently, an aryl group or an alkyl group (paragraph [0125]), and Y and Z represent, independently, a straight-chained or branched alkyl group in which at least one hydrogen is substituted with a fluorine atom, and the number of carbon atoms is from preferably 1 to 7 (paragraph [0123]). By combining at least one of the sulfonium compounds (b-1) or (b-2) within the resist composition a defect reduction (such as scum and pattern abnormalities) effect is achieved (paragraph [0132]). The presence of a bulky iminosulfonate structure causes the diffusion length to shorten, thus providing higher resolution (paragraph [0132]).

Art Unit: 1709

It would have been obvious to one of ordinary skill within the art at the time of the invention to use an iminosulfonate acid generator taught by Hada et al. specifically acid generator (b-1) or (b-2) in the resist composition of Hirayama et al. to reduce defects such as scum and pattern abnormalities as well as increase the resolution of the patterned resist.

With respect to claims 4, Hirayama et al. discloses a method of forming a resist pattern comprising:

- A. Forming a photoresist film of the resist composition of claim 1 onto a substrate (paragraphs [0184] and [0185]);
- B. Selectively exposing the resist film (paragraph [0188]); and
- C. Heating the resist film (paragraph [0189]) and developing the resist film to form a resist pattern (paragraph [0190]).

3. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (WO 2004088428 wherein citations are from US 2006/0166130) in view of Hada et al. (2004108780 wherein citations are from US 2007/0065748).

With regards to claims 1-3, Ogata et al. discloses a photoresist composition comprising:

- A. a polymer containing an alkali-soluble constituent unit consisting of an alicyclic group having both a fluorine atom or a fluorinated alkyl group and

Art Unit: 1709

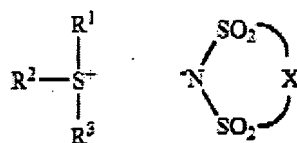
an alcoholic hydroxyl group wherein alkali solubility of the polymer is changed by action of an acid (paragraph [0042]);

- B. an acid-generating component which may be any known compound used in chemical amplification type resist (paragraph [0067]);
- C. a nitrogen-containing compound such as an alkanol amine compound (paragraph [0085]) for example, triethanolamine and triisopropanolamine (paragraph [0086]) and a tertiary alkylamine – paragraph [0085]); and
- D. an organic carboxylic acid such as malic acid, succinic acid, and benzoic acid (paragraph [0083]) or an oxo acid of phosphorus such as phosphoric acid, di-n-butylphosphate ester and diphenylphosphate ester (paragraph [0084]).

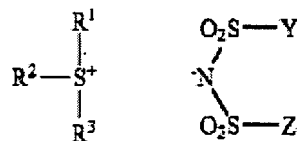
Although Ogata et al. discloses the use of an acid-generating compound, Ogata et al. failed to disclose the use of an acid-generating compound comprising an iminosulfonate structure as claimed by applicant in claim 1.

Hada et al. discloses photoresist compositions comprising an iminosulfonate acid generator component that is represented by formulas (b-1) and (b-2) (or sulfonium compounds 1 and sulfonium compounds 2, respectively – paragraph [0121]) that meets the limitations of the acid-generating agent set forth by applicant in claim 1.

Art Unit: 1709



(b-1)



(b-2)

In formulas (b-1) and (b-2), X represents a straight chain or branched alkylene grouping which at least one hydrogen atom has been substituted with a fluorine atom (paragraph [0122]), R¹ to R³ each represent, independently, an aryl group or an alkyl group (paragraph [0125]), and Y and Z represent, independently, a straight-chained or branched alkyl group in which at least one hydrogen is substituted with a fluorine atom, and the number of carbon atoms is from preferably 1 to 7 (paragraph [0123]). By combining at least one of the sulfonium compounds (b-1) or (b-2) within the resist composition a defect reduction (such as scum and pattern abnormalities) effect is achieved (paragraph [0132]). The presence of a bulky iminosulfonate structure causes the diffusion length to shorten, thus providing higher resolution (paragraph [0132]).

It would have been obvious to one of ordinary skill within the art at the time of the invention to use an iminosulfonate acid generator taught by Hada et al. specifically acid generator (b-1) or (b-2) in the resist composition of Ogata et al. to reduce defects such as scum and pattern abnormalities as well as increase the resolution of the patterned resist.

Art Unit: 1709

With respect to claims 4-5, Ogata et al. also discloses a method of forming a resist pattern comprising:

- A. applying the photoresist composition of claim 1 onto a substrate provided with an organic or inorganic anti-reflection film of SiON, SiN and Si₃N₄ (paragraph [0103]), and drying to form a resist film (paragraphs [0101]);
- B. selectively exposing the resist film (paragraph [0188]); and
- C. heating the resist film (paragraph [0102]) and developing the resist film to form a resist pattern (paragraph [0102]).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ponder N. Thompson-Rummel whose telephone number is 571-272-9816. The examiner can normally be reached on Monday-Friday 7:30 am - 5:00 pm EST.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1709

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ptr

PTR



**BARBARA GILLIAM
PRIMARY EXAMINER**